

Λ excitation function for Au+Au collisions from 2 to 8 AGeV

*D. Best, G. Rai, H.G. Ritter, H. Liu, S. Panitkin, D.L. Olson,
T.J.M. Symons, L. S. Schroeder, and the E895 Collaboration*

E895 [1] is investigating with its 4π detector Λ production for the symmetric system Au+Au at four different incident energies: 2, 4, 6 and 8 AGeV. Results on Λ production have been obtained earlier at the BEVALAC and at DUBNA for lighter mass systems (see [2] and references therein). Strange baryon production in relativistic heavy-ion collisions has been subject of many experimental measurements at AGS and CERN (see [3] for a recent summary). The following preliminary results about Λ production are based on the analysis of 40,000 events at 2 AGeV, 13,000 at 4, and about 30,000 at 6 and 8. The initial measurement of strange particle production showed a considerable enhancement over that predicted by a simple superposition of pp interactions. Enhanced strange particle production has been suggested as one of the signals of QGP formation; in contrast, secondary interactions in the hadronic system could also explain an enhancement. The E895 data are interesting in this respect since many hadronic thresholds are crossed. Measurement of an excitation function can provide more insight into the mechanism of particle production and also confront hadronic cascade models over a wider range of conditions, thus permitting a search for the onset of any new phenomena, e.g. the formation of a baryon-rich QGP. First results and analysis details are given elsewhere [4]. Figures 1 and 2 show an invariant mass spectrum for Λ s at 6 and 8 AGeV. The mass resolution is about 3–4 MeV. The mixed event technique allows a clean extraction of the signal. As shown in figure 1 the background (dotted histogram) is well characterized. The acceptance corrected data are plotted in figure 3 with a compilation of other published data for central trigger (5–10% σ_{geo}) and various targets and projectiles. Efficiency corrections that take a realistic multitrack environment into account

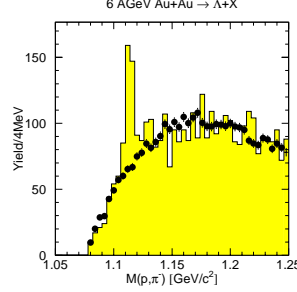


Figure 1: Λ invariant mass spectrum at 6 AGeV. Dotted histogram result of a mixed event analysis.

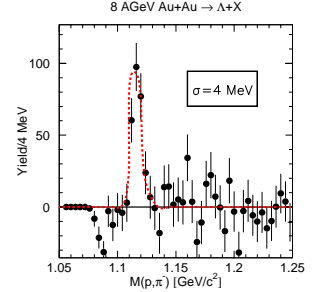


Figure 2: Background subtracted Λ invariant mass spectrum at 8 AGeV, mass resolution 4 MeV.

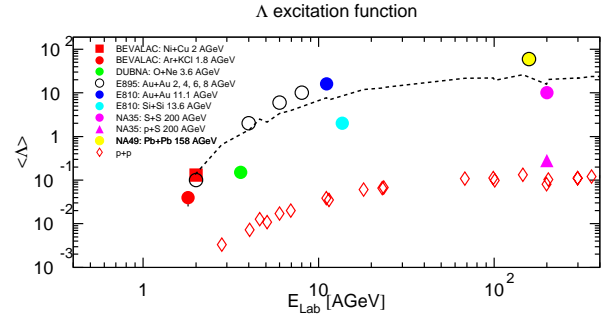


Figure 3: Λ excitation function for various targets and projectiles.

have not been applied to the data, but are under investigation. Diamonds represent the Λ yield for proton–proton collisions. The dashed line is the yield expected from scaling the pp data to Au+Au. The Λ excitation function shows no structure in this energy range.

References

- [1] G. Rai et al.; LBL Report 5399, August 1993
- [2] R. Stock; Phys. Rep. 135 (1986) 259
- [3] G. Odyniec; Quark Matter 97
- [4] D. Best et al.; J. Phys. G 23 (1997) 1873